CLAIMS

1. A solid-state laser oscillating device comprising:

a slab type laser medium for generating a laser beam by laser pumping; and

an optical resonator for resonating the laser beam generated by said slab type laser medium, said optical resonator having a bending mirror disposed close to one end face of said slab type laser medium in a longitudinal direction thereof, and partial and total reflection mirrors obliquely disposed adjacent to each other and close to the other end face of said slab type laser medium,

said bending mirror, said partial reflection mirror and said total reflection mirror being arranged so that an optical path is obliquely formed between said partial and total reflection mirrors via said bending mirror with a longitudinal axis of said slab type laser medium situated therebetween, in a first section along an extending direction of a pair of opposite sides of a rectangular section perpendicular to said longitudinal axis, to let a laser beam out of said optical resonator through said partial reflection mirror.

2. A slab type solid-state laser oscillating device according to claim 1, wherein said laser beam repeatedly undergoes total reflections in said slab type laser medium, and said optical path zigzags in a second section perpendicular to said first section.

3. A slab type solid-state laser oscillating device according to claim 1, wherein said one end face and the other end face of said slab type laser medium are inclined at an angle approximately satisfying

Brewster's condition in said second section.

4. A slab type solid-state laser oscillating device comprising:

a slab type laser medium for generating a laser beam by laser pumping; and

an optical resonator for resonating the laser beam generated by said slab type laser medium, said optical resonator having a bending mirror disposed close to one end face of said slab type laser medium in a longitudinal direction thereof, and partial and total reflection mirrors obliquely disposed adjacent to each other and close to another end face of said slab type laser medium,

said bending mirror, said partial reflection mirror and said total reflection mirror being arranged so that an optical path is obliquely formed between said partial and total reflection mirrors via said bending mirror with a longitudinal axis of said slab type laser medium situated therebetween, in a first section along an extension direction of a pair of opposite sides of a rectangular section perpendicular to said longitudinal axis, and that said optical path formed in said optical resonator occupies at least a 50% part of said slab type laser medium, to let a laser beam out of said optical resonator through said partial reflection mirror.

5. A slab type solid-state laser oscillating device according to claim 4, wherein said laser beam repeatedly undergoes total reflections in said slab type laser medium, and said optical path zigzags in a second section perpendicular to said first section.

6. A slab type solid-state laser oscillating device according to claim 4, wherein said one end face and the other end face of said slab

type laser medium are inclined at an angle approximately satisfying Brewster's condition in said second section.

7. A slab type solid-state laser oscillating device comprising:

a slab type laser medium for generating a laser beam by means of laser pumping; and

an optical resonator for resonating the laser beam generated by said slab type laser medium, said optical resonator having a bending mirror disposed close to one end face of said slab type laser medium in a longitudinal direction thereof, and partial and total reflection mirrors obliquely disposed adjacent to each other and close to the other end face of said slab type laser medium,

said bending mirror, said partial reflection mirror and said total reflection mirror being arranged so that an optical path is obliquely formed between said partial and total reflection mirrors via said bending mirror with a longitudinal axis of said slab type laser medium situated therebetween, in a first section along an extension direction of a pair of opposite sides of a rectangular section perpendicular to said longitudinal axis, to let a laser beam out of said optical resonator through said partial reflection mirror, and a condition indicated by an expression below being fulfilled,

$$u + s \leq (L + h)/2 \quad \cdots [1]$$

(where s: length of said slab type laser medium in the longitudinal direction; u: distance between a center of a reflecting surface of a spherical mirror and a closer one of the end faces of said slab type laser medium; L: radius of curvature of the reflecting surface of the spherical

mirror; h: length of an overlapping region in the longitudinal direction of said slab type laser medium, the overlapping region being a region where a beam path between said partial reflection mirror and said bending mirror overlaps with a beam path between said total reflection mirror and said bending mirror).

8. A slab type solid-state laser oscillating device according to claim 7, wherein said laser beam repeatedly undergoes total reflections in said slab type laser medium, and said optical path zigzags in a second section perpendicular to said first section.

9. A slab type solid-state laser oscillating device according to claim 7, wherein said one end face and the other end face of said slab type laser medium are inclined at an angle approximately satisfying Brewster's condition in said second section.

10. A slab type solid-state laser oscillating device according to any one of claims 1 through 9, wherein said slab type laser medium comprises a YAG laser crystal doped with Nd.